



[Subscribe](#) (Full Service)

[Register](#) (Limited Service, Free)

[Login](#)

Search: The ACM Digital Library The Guide

SEARCH

THE GUIDE TO COMPUTING LITERATURE

[Feedback](#)

The hyper-Wiener index of graph operations

Source **Computers & Mathematics with Applications** [archive](#)

Volume 56 , Issue 5 (September 2008) [table of contents](#)

Pages 1402-1407

Year of Publication: 2008

ISSN:0898-1221

Authors

[M. H. Khalifeh](#) School of Mathematics, Statistics and Computer Science, University of Tehran, Tehran, Islamic Republic of Iran

[H. Yousefi-Azari](#) School of Mathematics, Statistics and Computer Science, University of Tehran, Tehran, Islamic Republic of Iran

[A. R. Ashrafi](#) Department of Mathematics, Faculty of Science, University of Kashan, Kashan 87317-51167, Islamic Republic of Iran

Publisher

Pergamon Press, Inc. Tarrytown, NY, USA

Bibliometrics

Downloads (6 Weeks): n/a, Downloads (12 Months): n/a, Citation Count: 0

Additional Information:[abstract](#) [references](#) [index terms](#) [collaborative colleagues](#)**Tools and Actions:**[Review this Article](#)[Save this Article to a Binder](#)Display Formats: [BibTex](#) [EndNote](#) [ACM Ref](#)**DOI Bookmark:**[10.1016/j.camwa.2008.03.003](https://doi.org/10.1016/j.camwa.2008.03.003)**↑ ABSTRACT**

Let G be a graph. The distance $d(u,v)$ between the vertices u and v of the graph G is equal to the length of a shortest path that connects u and v . The Wiener index $W(G)$ is the sum of all distances between vertices of G , whereas the hyper-Wiener index $WW(G)$ is defined as $WW(G) = 2W(G) + \sum_{\{u,v\} \in V(G)} d(u,v)^2$. In this paper the hyper-Wiener indices of the Cartesian product, composition, join and disjunction of graphs are computed. We apply some of our results to compute the hyper-Wiener index of C^4 nanotubes, C^4 nanotori and q -multi-walled polyhex nanotori.

↑ REFERENCES

Note: OCR errors may be found in this Reference List extracted from the full text article. ACM has opted to expose the complete List rather than only correct and linked references.

- [1] Dobrynin, A.A., Entringer, R. and Gutman, I., Wiener index of trees: Theory and applications. Acta Appl. Math. v66. 211-249.
- [2] Dobrynin, A.A., Gutman, I., Klavzar, S. and Zigert, P., Wiener index of hexagonal systems. Acta Appl. Math. v72. 247-294.

- [3] MATCH Commun. Math. Comput. Chem. v35. 1259
- [4] Discrete Appl. Math. v80 i1. 1113
- [5] Wiener, H., Structural determination of the paraffin boiling points. J. Am. Chem. Soc. v69. 17-20.
- [6] Klein, D.J., Lukovits, I. and Gutman, I., On the definition of the hyper-Wiener index for cycle-containing structures. J. Chem. Inf. Comput. Sci. v35. 50-52.
- [7] Cash, G.G., Relationship between the Hosoya polynomial and the Hyper-Wiener index. Appl. Math. Lett. v15. 893-895.
- [8] Cash, G.G., Polynomial expressions for the hyper-Wiener index of extended hydrocarbon networks. Comput. Chem. v25. 577-582.
- [9] Gutman, I., Relation between hyper-Wiener and Wiener index. Chem. Phys. Lett. v364. 352-356.
- [10] Klavzar, S., Zigert, P. and Gutman, I., An algorithm for the calculation of the hyper-Wiener index of benzenoid hydrocarbons. Comput. Chem. v24. 229-233.
- [11] Klavzar, S. and Gutman, I., A theorem on Wiener-type invariants for isometric subgraphs of hypercubes. Appl. Math. Lett. v19. 1129-1133.
- [12] Li, X. and Jalbout, A.F., Bond order weighted hyper-Wiener index. J. Mol. Structure (Theochem). v634. 121-125.
- [13] Zhou, B. and Gutman, I., Relations between Wiener, hyper-Wiener and Zagreb indices. Chem. Phys. Lett. v394. 93-95.
- [14] Graovac, A. and Pisanski, T., On the Wiener index of a graph. J. Math. Chem. v8. 53-62.
- [15] Sagan, B.E., Yeh, Y.-N. and Zhang, P., The Wiener polynomial of a graph. Int. J. Quant. Chem. v60 i5. 959-969.

- [16] Klavzar, S., Rajapakse, A. and Gutman, I., The Szeged and the Wiener index of graphs. Appl. Math. Lett. v9. 45-49.
- [17] Khalifeh, M.H., Yousefi-Azari, H. and Ashrafi, A.R., Vertex and edge PI indices of cartesian product graphs. Discrete Appl. Math.
- [18] M.H. Khalifeh, H. Yousefi-Azari, A.R. Ashrafi, I. Gutman, The Edge Szeged Index of Product Graphs, Croat. Chem Acta, 81 (2) (2008) (in press)
- [19] M.H. Khalifeh, H. Yousefi-Azari, A.R. Ashrafi, The first and second zagreb indices of graph operations (in press)
- [20] Yousefi-Azari, H., Manoochehrian, B. and Ashrafi, A.R., The PI index of product graphs. Appl. Math. Lett. v21 i6. 624-627.
- [21] Imrich, W. and Klavzar, S., Product Graphs: Structure and Recognition. 2000. Wiley, New York, USA.
- [22] Khalifeh, M.H., Yousefi-Azari, H. and Ashrafi, A.R., A matrix method for computing szeged and vertex pi indices of join and composition of graphs. Linear Algebra Appl.
- [23] Khadikar, P.V., On a novel structural descriptor PI. Nat. Acad. Sci. Lett. v23. 113-118.
- [24] Ashrafi, A.R. and Loghman, A., PI index of zig-zag polyhex nanotubes. MATCH Commun. Math. Comput. Chem. v55 i2. 447-452.
- [25] M.V. Diudea, I. Gutman, L. Jantschi, Molecular Topology, Huntington, NY, 2001
- [26] Trinajstic, N., Chemical Graph Theory. 1992. CRC Press, Boca Raton, FL.
- [27] H. Yousefi-Azari, A.R. Ashrafi, Padmakar-Ivan Index of q-Multi-walled Carbon Nanotubes and Nanotori, J. Comput. Theor. Nanosci. (in press)
- [28] Gutman, I., A property of the Wiener number and its modifications. Indian J. Chem. v36A. 128-

132.

- [29] Yousefi, S. and Ashrafi, A.R., An Exact expression for the wiener index of a polyhex nanotorus. MATCH Commun. Math. Comput. Chem. v56. 169-178.
- [30] S. Yousefi, H. Yousefi-Azari, A.R. Ashrafi, M.H. Khalifeh, Computing Distance Matrix and Related Topological Indices of a Polyhex Nanotorus (submitted for publication)

↑ INDEX TERMS

Primary Classification:

- G. [Mathematics of Computing](#)
- ↳ G.2 [DISCRETE MATHEMATICS](#)
- ↳ G.2.2 [Graph Theory](#)

Additional Classification:

- F. [Theory of Computation](#)
- ↳ F.2 [ANALYSIS OF ALGORITHMS AND PROBLEM COMPLEXITY](#)
- ↳ F.2.1 [Numerical Algorithms and Problems](#)
- ↳ **Subjects:** [Computations in finite fields](#)
- ↳ F.2.2 [Nonnumerical Algorithms and Problems](#)

- G. [Mathematics of Computing](#)
- ↳ G.2 [DISCRETE MATHEMATICS](#)
- ↳ G.2.1 [Combinatorics](#)
- ↳ **Subjects:** [Combinatorial algorithms](#)

General Terms:

[Algorithms](#), [Design](#), [Theory](#)

Keywords:

[C4 nanotorus](#), [C4 nanotube](#), [Graph operations](#), [Hyper-Wiener index](#), [q-multi-walled nanotube](#)

↑ Collaborative Colleagues:

M. H. Khalifeh: [colleagues](#)

H. Yousefi-Azari: [colleagues](#)

A. R. Ashrafi: [colleagues](#)

The ACM Portal is published by the Association for Computing Machinery. Copyright © 2008 ACM, Inc.

[Terms of Usage](#) [Privacy Policy](#) [Code of Ethics](#) [Contact Us](#)

Useful downloads:  [Adobe Acrobat](#)  [QuickTime](#)  [Windows Media Player](#)  [Real Player](#)